ESCI 428: Reflection Seismic Data Interpretation

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Office Hours: Wednesdays and Thursdays 1-2 PM, or by appt.

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Class Meetings: Mondays 1:00-4:00 PM
Keith-Wiess 130

Required Text: Bacon, Simm and Redshaw, 2007, *3-D Seismic Interpretation*. Cambridge University Press.

Supplemental Reading: Alistair R. Brown, 2004, *Interpretation of Three-Dimensional Seismic Data. 6th Edition*. AAPG Memoir 42.
Christopher L. Liner, 2004, *Elements of 3D Seismology. 2nd Edition*. PennWell.

Course Goals:
The goal of this course is to introduce you to workstation-based seismic interpretation methods using Landmark software. We will review basic wave propagation theory and then focus on structural and stratigraphic interpretation of various 3D seismic data sets. At the end of the course, participants will have a sound practical and theoretical knowledge of 3D interpretation techniques. Participants will be able to independently interpret a 3D data set on a Landmark workstation and present structural and sedimentary models based on a variety of data sets.

Honor Code:
The honor system is one of the oldest traditions at Rice and requires each Rice student to adhere to a strict code of academic integrity. All homework and class exercises must be completed on your own. The Landmark workstation interpretation system that we will be using in class is designed to facilitate collaboration, and in some cases, it will be possible for you to view other students' work within the software package. Please do not view other students' work unless you have permission of both the instructor and the student.

Accommodations:
If you have a documented disability that will impact your work in this class, please contact me to discuss your needs. Additionally, you will need to register with the Disability Support Services Office in the Ley Student Center.

Grading:

Course attendance and participation (10%) You are expected to attend every class and actively participate for the full 3 hours.

Class exercises and homework (40%) Class exercises will consist of workstation-based interpretation assignments, which will typically be started during class time and finished on your own. You will be expected to spend time in the computer lab outside of class hours.

Midterm exam (15%) An in-class mid-term exam will cover the material presented in lecture as well as lab sessions.

Leading an article or chapter discussion (10%) You will be assigned to lead one class discussion of the assigned reading, which will consist of either a book chapter or a journal article. Please prepare a summary of the reading, questions that you had about the material, and several discussion points for the class.

Final project (25%) The final project will consist of a seismic interpretation project that will be assigned toward the end of the semester. A grading rubric will be distributed at that time.

Syllabus (subject to change):

Week	Lecture Topic	Lab Topic	Readings
1 – Jan 9	Introduction to seismic reflection	Introduction to workstation interpretation with Landmark/Seisworks	Bacon Ch. 1 Intro and Ch 2 (land and marine acquisition sections only)
Jan 16	*MLK Day Holiday, no classes*		
2 – Jan 23	Seismic interpretation methods	Fault interpretation – Teapot Dome	Bacon Ch. 3 Structural interpretation
3 – Jan 30	Structural Interpretation of Seismic Data	Fault interpretation – Teapot Dome	Bacon Ch. 4 Geological interpretation
4 – Feb 6	Structural Interpretation of Seismic Data	Horizon interpretation – Teapot Dome	Conn and Rodriguez (2011) – Sierra Leone Bacon Ch. 5 Interpreting seismic amplitudes
5 – Feb 13	Interpretation of Seismic Amplitudes	Interpretation of Boonsville	Campbell (2011) – South Africa
6 – Feb 20	Midterm exam		
Feb 27	*Spring Break, no classes*		
7 – Mar 5	Well logs and review for midterm	Interpretation of Boonsville	Treadgold et al. (2011) – Eagle Ford
8 – Mar 12	Guest lecture – Dr. Erik Scott, Marathon	Snark	Amogu et al. (2011) – Niger Delta
9 –Mar 19	Guest lecture – Dr. Gaynor Paton, ffA, or Casey Donahue?	Snark	Readings for Dr. Bally
10 – Mar 26	Guest lecture – Dr. Bally	Regional geology, review of Snark interpretation	Gao (2009) – workflow paper
11 – Apr 2	Introduction to Seismic Attributes	Calculation and display of seismic attributes	Chopra and Marfurt (2006) - Attributes paper Bacon Ch. 7 3-D seismic data visualization
12 – Apr 9	Work on final project	Work on final project	
13 – Apr 16	Final project presentations	Final project presentations	